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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Sumit A. Talwalkar

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10/18/2004

Frank M. Scutch, III
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EXAMINER

MEEK, JACOB M

ART UNIT

PAPER NUMBER

2637

DATE MAILED: 10/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

K-8

Office Action Summary	Application No.	Applicant(s)	
	09/896,703	TALWALKAR ET AL.	
	Examiner	Art Unit	
	Jacob Meek	2637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 June 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 - 16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 - 16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on _____ is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claim 3 objected to because of the following informalities: "Second IF filter" is referenced in this claim. There is no antecedent in the claims for a second IF filter. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 - 15 rejected under 35 U.S.C. 103(a) as being unpatentable over

Wannasarnmaytha et al (Two-step Kalman-filter-based AFC for direct conversion-type receiver in LEO

satellite communications; Wannasarnmaytha, A.; Hara, S.; Morinaga, N.; Vehicular Technology, IEEE

Transactions on , Volume: 49 , Issue: 1 , Jan. 2000 , Pages:246 – 253).

With regard to Claim 1, Wannasarnmaytha teaches a digital receiver consisting of a first channel select (CS) filter filtering an incoming digital signal (see Figure 2, LPF); a frame synchronization detector for recognizing a time synchronization word from the first filtered signal; a coarse symbol time estimator for coarsely adjusting the time synchronization of the digital signal from the frame synchronization detector (see Figure 2, Kalman filter in Coarse Kalman filter-based AFC, where examiner interprets Kalman filters to provide time estimation and frame observation capabilities); a fine frequency estimator for finely adjusting the frequency of the signal from the coarse symbol time estimator for providing a frequency adjusted signal (see Figure 2, S/H and NCO for frequency adjustment components); a mixer

for combining the incoming digital signal with the frequency adjusted signal and providing a time and frequency compensated digital signal (see Figure 2, mixer block in Coarse Kalman-Filter block and page 248, right column, last paragraph); a second CS filter for filtering the frequency compensated digital signal (see Figure 2, Root Nyquist filter); a fine symbol time estimator for determining symbol timing with greater precision (see Figure 2, Fine Kalman-Filter block); and a symbol detector for interpreting the incoming digital signal (see Figure 2, decision block and output data).

Wannasarnmaytha is silent on the specific details regarding single synchronization word noted in preamble of the claim. However, Wannasarnmaytha discusses large frequency offsets that are present in the satellite system disclosed (± 40 kHz, Section V, 1st paragraph). Therefore it would be possible with smaller frequency offsets for acquisition times to be faster for disclosed system. Also, synch words are assumed to be present as a standard matter of data transmission protocol.

With regard to Claim 2, Wannasarnmaytha teaches the limitations of claim 1 with the addition of a digital receiver wherein the first CS filter has a wider bandwidth than second CS filter. Wannasarnmaytha states that the Root Nyquist filter of Figure 2 performs a pulse shaping function (page 249, left column, 1st full paragraph) which examiner interprets as further limiting the bandwidth of the received signal.

With regard to Claim 3, Wannasarnmaytha teaches the limitations of claim 1 with the addition of a digital receiver wherein the 2nd IF (CS?) filter has less bandwidth than the 1st CS filter. Wannasarnmaytha states that the Root Nyquist filter of Figure 2 performs a pulse shaping function (page 249, left column, 1st full paragraph) which examiner interprets as further limiting the bandwidth of the received signal. The selection of the filter ratios would be a design choice based on the operating parameters of the system.

With regard to claim 4, Wannasarnmaytha teaches the limitations of claim 1.

Wannasarnmaytha fails to teach the first CS filter has a 3 decibel (dB) bandwidth of approximately 6 Kilohertz (KHz). Wannasarnmaytha teaches the first CS filter has a bandwidth of approximately 32 (16, 8) Kilohertz (KHz)(see Table 1). Selection of the 1st filter bandwidth would be a design choice based on the operating parameters of the system.

With regard to claim 5, Wannasarnmaytha teaches the limitations of claim 4.

Wannasarnmaytha fails to teach the 2nd CS filter has a 3 decibel (dB) bandwidth of approximately 3 Kilohertz (KHz). Wannasarnmaytha teaches the 2nd CS filter has performs pulse shaping on the output of the coarse acquisition phase which examiner interprets as further limiting the bandwidth of received signal. Selection of the 2nd filter bandwidth would be a design choice based on the operating parameters of the system.

With regard to Claim 6, Wannasarnmaytha teaches fast frequency and time acquisition system consisting of a first channel select filter for filtering digital baseband information (see Figure 2, LPF); a frame synchronization detector for detecting a synchronization word in the digital baseband information from the first CS filter; a coarse symbol time estimator coarsely determining the symbol time of the digital signal from the frame synchronization detector (see Figure 2, Kalman filter in Coarse Kalman filter-based AFC, where examiner interprets Kalman filters to provide time estimation and frame observation capabilities); a fine frequency estimator for finely determining the frequency error of the signal from the coarse symbol time estimator providing frequency adjustment (see Figure 2, S/H and NCO for frequency adjustment components); a mixer for combining the unfiltered digital information with the frequency error estimate to provide a mixed frequency corrected digital signal (see Figure 2, mixer block in Coarse Kalman-Filter block and page 248, right column, last paragraph); a second CS filter for filtering the mixed digital signal (see Figure 2, Root Nyquist filter); a fine

symbol time estimator for finely determining the symbol time of the signal from the second CS filter (see Figure 2, Fine Kalman-Filter block); and a symbol detector for decoding the digital signal from the fine symbol time estimator (see Figure 2, decision block and output data).

With regard to claim 7, Wannasarnmaytha teaches the limitations of claim 6.

Wannasarnmaytha teaches a Coarse Kalman-Filter block which provides (see Figure 2) which provides the coarse symbol time estimator for coarsely estimating the symbol time of the digital signal (see Figure 2, Kalman filter in Coarse Kalman filter-based AFC, where examiner interprets Kalman filters to provide time estimation and frame observation capabilities); and a fine frequency estimator for finely estimating the frequency of the digital signal from the coarse symbol time estimator (see Figure 2, S/H and NCO for frequency adjustment components).

With regard to Claim 8, Wannasarnmaytha teaches the limitations of claim 6 with the addition of a digital receiver wherein the first CS filter has a wider bandwidth than second CS filter. Wannasarnmaytha states that the Root Nyquist filter of Figure 2 (page 249, left column, 1st full paragraph) performs a pulse shaping function which examiner interprets as further limiting the bandwidth of the received signal.

With regard to Claim 9, Wannasarnmaytha teaches the limitations of claim 6 with the addition of a digital receiver wherein the 2nd CS filter has less bandwidth than the 1st CS filter. Wannasarnmaytha states that the Root Nyquist filter of Figure 2 (page 249, left column, 1st full paragraph) performs a pulse shaping function which examiner interprets as further limiting the bandwidth of the received signal. The selection of the filter ratios would be a design choice based on the operating parameters of the system.

With regard to claim 10, Wannasarnmaytha teaches the limitations of claim 6.

Wannasarnmaytha fails to teach the first CS filter has a 3 decibel (dB) bandwidth of

approximately 6 Kiloherzt (KHz). Wannasarnmaytha teaches the first CS filter has a bandwidth of approximately 32 (16, 8) Kiloherzt (KHz) (see Table 1). Selection of the 1st filter bandwidth would be a design choice based on the operating parameters of the system.

With regard to claim 11, Wannasarnmaytha teaches the limitations of claim 10. Wannasarnmaytha fails to teach the 2nd CS filter has a 3 decibel (dB) bandwidth of approximately 3 Kiloherzt (KHz). Wannasarnmaytha teaches the 2nd CS filter has performs pulse shaping on the output of the coarse acquisition phase which examiner interprets as further limiting the bandwidth of received signal. Selection of the 2nd filter bandwidth would be a design choice based on the operating parameters of the system.

As to claims 12 – 16, the steps claimed as method are a restating of the function of the apparatus of the specific components of the apparatus as claimed above and therefore it would have been obvious considering the aforementioned rejection for the apparatus claims 1

– 5.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kleider and Humphrey (Robust time-frequency synchronization for OFDM mobile applications) disclose a method for synchronizing on a single word. Kazecki (US Patent 5,131,008), Leung et al (US Patent 5,444,697), Philips (US Patent 5,550,812), Jacklin (US Patent 5,983,823) all present systems which provide methods with coarse and fine tuning means which appear to be closely related to applicant's field of endeavor.

Art Unit: 2637


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jacob Meek whose telephone number is (571)272-3013.

The examiner can normally be reached on 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on (571)272-2988. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JMM



JAYANTI PATEL
SUPERVISORY PATENT EXAMINER